PATENT

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January 4, 2005
Date

Phoebe E. Pogson

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 09/400,350	Confirmation No.	: 3341
Applicants	: Clarence T. Tegreene et al.		
Filed	: September 20, 1999	Attorney Docket No.:	(MVIS-97-14 CIP)
Art Unit	: 2674	Customer No.	: 27,076
Examiner	: Kevin M. Nguyen		
Title	: OPTICAL SCANNING SYSTEM WITH CORRECTION		

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF (37 C.F.R. § 1.192)

Sir:

The applicants, Clarence T. Tegreene and David L. Dickensheets, hereby appeal to the Board of Patent Appeals and Interferences from the decision of the Examiner dated February 5, 2004 finally rejecting claim 27, which is the only claim in the application.

This brief is in furtherance of the Notice of Appeal, filed in this application on August 4, 2004. The fees required under Section 1.17(f), and any required request for extension of time for filing this brief and fees therefore, are dealt with in the accompanying transmittal letter.

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I. REAL PARTY IN INTEREST

The real parties in interest in this appeal is the assignees of this application, Microvision, Inc., a Washington Corporation having a principal place of business at Bothell, Washington, and Research & Development Institute, Inc., a Montana Corporation having a principal place of business at Bozeman, Montana.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellants, the appellants' legal representative, or the assignees, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claim 27 is the sole claim in this application. Claim 27 has been finally rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,629,790 to Neukermans *et al.* Claim 27 has also been rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,201,629 to McClelland *et al.* in view of U.S. Patent No. 6,102,294 to Swartz *et al.*

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the Office Action of February 5, 2004 finally rejecting claim 27. All amendments that have been filed have been entered.

V. SUMMARY OF THE INVENTION

The invention involved in this appeal relates to an apparatus for scanning a beam of light in a scan path at a selected scan rate. The scanned light beam can be used to create an image by, for example, directing the light beam onto a screen that can be viewed or directing the light beam directly onto the retina of a viewer. The scanned light beam can also be used to detect an image by, for example, directing the light beam onto a target object and collecting light scattered by the target object. Claim 27 is directed to a scanning apparatus that includes a reflector that resonates in the path of the light beam so that the light beam is reflected from the reflector. The reflector includes a micromechanical membrane that can deform to alter the

characteristics of the light beam reflected from the reflector. One of the functions that can be performed by deformation of the reflector is to correct aberrations in the scanned beam. This function will be explained with reference to Figure 44, which is reproduced below:

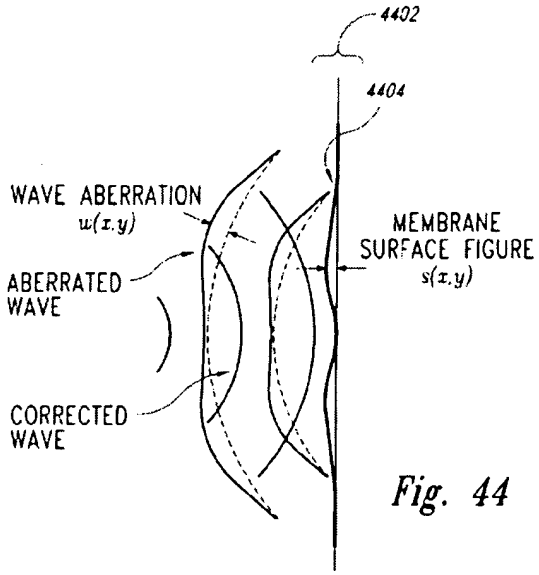


Fig. 44

As explained on page 29:

> [w]avefront aberration, as used herein refers to deviations of the actual constant phase wavefront produced by the optical system from a perfect sphere centered on the image point, as illustrated in Figure 44. A corrective element 4402, which may be an ACM [aberration compensation membrane], adds a variable optical path delay to the wavefront in order to just cancel the aberration and produce a wavefront that is more closely approaches a spherical wavefront. A reflective element 4404, such as a mirror, with surface figure s(x,y) will add a correction w(x,y)=2s(x,y)."

The use of a reflective membrane that is deformable can also serve other functions in addition to serving as an ACM to correct aberrations. Some of these are described

on page 38 of the specification. One example of a scanning system using the deformable reflective membrane is shown in Figure 8, which is reproduced below.

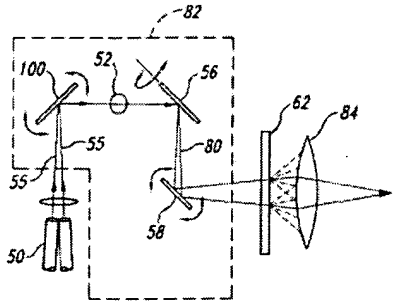


Fig. 8

The mirror 56 is used for scanning the beam 55 horizontally, and the mirror 58 is used for scanning the beam vertically. Either of these mirrors can be considered to be a "primary mirror" recited in claim 27. As described on page 17 of the specification, "[t]he correction mirror 100 carries a deformable membrane 180 that can compensate for aberrations in the optical system or optical path length variations due to the scanning systems." It is this correction mirror 100 that is one example of the resonant reflector formed by the microelectromechanical deformed membrane as recited in claim 27.

VI. ISSUES

The sole issues presented for review are (1) whether the invention defined by claim 27 is anticipated by U.S. Patent No. 5,629,790 to Neukermans *et al.*, and (2) whether the invention defined by claim 27 would have been obvious over U.S. Patent No. 6,201,629 to McClelland *et al.* in view of U.S. Patent No. 6,102,294 to Swartz *et al.*

VII. GROUPING OF CLAIMS

Insofar as there is only one claim in this application, the grouping of claims for purposes of this appeal is not an issue.

VIII. ARGUMENT

1. Claim 27 Is Not Anticipated By The Patent To Neukermans et al.

A. The Subject Matter Of Claim 27

As explained above, claim 27 is directed to a scanning apparatus having a primary mirror and a resonant reflector. The primary mirror moves through a predetermined scan path at a selected rate that determines its scanning period and scanning frequency. The resonant reflector is aligned with the primary mirror so that a beam is reflected from both the primary mirror and the resonant reflector. The resonant reflector moves resonantly through a movement path at a resonant frequency. The scanning frequency of the primary mirror is an integral multiple of this resonant frequency. The resonant reflector is limited to a microelectromechanical (MEMS) membrane in which the movement path of the resonant reflector includes deformation of the membrane forming the resonant reflector. The resonant reflector can therefore be used, *inter alia*, for correcting aberrations as described above.

B. The Subject Matter Disclosed In the Neukermans et al. Patent

The patent to Neukermans *et al.* discloses a scanner having a central mirror 82 suspended by torsion bars 84. A wire coil 85 is connected to conductors 86, 87 which are carried by one of the torsion bars 84. According to the Office Action, "Neukermans et al teach a scanner which includes a primary mirror 82 (fig. 5a), a resonant reflector (a mirror 82 and a coil 85, fig. 5a)." Thus, the mirror 82 purportedly serves as both the "primary mirror" and the "resonant reflector."

The Office Action also states "the primary mirror 82 (fig. 5a) in the resonant reflector (the mirror 82 and the coil 85, fig. 5a) perform the function of the scanning frequency is an integral multiple of the resonant frequency." Thus, according to the Office Action, the mirror 82 scans at a frequency that is an integral multiple of its own resonant frequency.

The Office Action further states that "deformation of the membrane (the torsional scanner 12 twists in one direction and then twists in an opposite direction, fig. 1c, col. 3, lines 36-38)." The cited portion of the Neukermans *et al.* patent refers to Figure 1e, which shows the mirror supporting torsion bars 14, 16 bending in the plane of the mirror 12. It does not show any deformation of the mirror 12 itself. Figure 1c similarly shows the torsion bars 14, 16 bending in

a plane perpendicular to the surface of the mirror 12. Again, figure 1c does not show any bending or deformation of the mirror 12 itself.

The "Response to Arguments" section of the Office Action indicates that the micro scanner mirror 192 "can be tuned to an integral multiple of the horizontal scanning frequency" and then references "page 27, lines 11-21 of the specification for additional explanation of MEMs scanner of Neukermanns '790 patent)." Thus, the Office Action does not contend that the Neukermans *et al.* patent actually teaches a resonant reflector tuned to a multiple of a scanning frequency of another mirror, but only that it "can" be tuned to such frequency. Further, the Office Action relies for such teaching not on the prior art but instead on the teaching in lines 11-21 of page 27 of applicants' own specification.

C. Claim 27 Is Not Anticipated By The Patent To Neukermans et al.

The test for anticipation is whether the claim reads on the product or process disclosed in the prior art, not on what that reference broadly "teaches." *SSIH Equip. S.A. v. United States Int's Trade Comm'n*, 718 F.2d 365 (Fed. Cir. 1983). As the Federal Circuit held in *Titanium Metals Corp. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985), anticipation can be found only if a reference shows *exactly* what is claimed. In this case, the *Neukermans et al.* patent does not show a primary mirror and a resonant reflector as specified in claim 27. Instead, the *Neukermans et al.* patent shows only a single mirror. Furthermore, claim 27 specifies that the primary mirror has a selected scan rate defining a "scanning frequency," and that the scanning frequency is "an integral multiple of the resonant frequency" of the resonant reflector. Thus, the resonant reflector must scan at a frequency that is different from the scan frequency of the primary mirror. Even if, as contended in the Office Action, the mirror 82 disclosed in the *Neukermans et al.* patent "can" be tuned to the scanning frequency of a primary mirror, that fact would not cause the *Neukermans et al.* patent to anticipate claim 27 absent such a teaching in the *Neukermans et al.* patent itself. Clearly the Examiner's attempt to supply the teachings that are missing from the *Neukermans et al.* patent using page 27, lines 11-21 of applicants' specification is improper.

The *Neukermans et al.* patent also fails to anticipate claim 27 because it does not disclose the claimed deformation of the microelectromechanical membrane that is used as the resonant reflector. As in the example shown in Figure 44 above, claim 27 specifies that it is the

membrane forming the resonant reflector that must deform. As described in the specification and as shown in Figure 44, it is this deflection that can perform such functions as correcting aberrations. In contrast, the *Neukermans et al.* patent teaches that it is the torsion bars supporting the disclosed mirror that must deform. Yet claim 27 does not specify that it is the support structure for the resonant reflector that deforms. Instead, it is the micro electromechanical membrane used as the resonant reflector that must deform. Furthermore, the torsion bars, even if one considers them to undergo deformation, do not constitute a membrane, which is defined as being a "thin pliable layer." Webster's New Riverside University Dictionary. Instead the "torsion bars" disclosed by *Neukermans et al.* are just that, *i.e.,* bars that are square or circular in cross-section as clearly shown in Figures 1a-e.

For all these reasons, the *Neukermans et al.* patent clearly fails to anticipate claim 27.

2. Claim 27 Would Not Have Been Obvious Over The Patent To McClelland *et al.* In View Of The Patent To Swartz *et al.*

A. The Subject Matter Disclosed In the McClelland et al. Patent

The teachings of the McClelland *et al.* patent are similar to those of the *Neukermans et al.* in that it teaches a mirror 3 supported by a pair of torsion bars 5. The Office Action contends that the McClelland *et al.* patent teaches the claimed "primary mirror," and applicant's do not dispute this contention. However, the Office Action further contends that "a coil 31 (fig. 8D) and a mirror 3 (fig. 1) disposed on the support 4 (fig. 8A) are a resonant reflector 31 (fig. 8D) aligned to the scanning the mirror 3 (fig. 1) and being of a type that moves resonantly through a movement path at a resonant frequency, wherein the scanning frequency is an integral multiple of the resonant frequency (see figures 1 and 8D, column 8, lines and 51-58 and column 11, lines 20-41)." (emphasis original). Thus, the Office Action contends that the mirror 3 is "aligned to the scanning mirror 3," *i.e.*, it is aligned with itself, which is a physical impossibility. Furthermore, the "resonant reflector 31 (fig. 8D)" referred to in the Office Action is not a reflector of any type, resonant or not. Instead, element 31 is a coil. In fact, the scanners shown in Figures 8A-E are simply various embodiments of the scanner shown in Figure 1.

There is no disclosure or suggestion of using the scanner of Figure 1 in combination with the scanners of Figures 8A-E.

Finally, the Office Action admits that "to McClelland *et al.* fail to teach a related scanner which includes a microelectromechanical membrane having deformation of the membrane."

B. The Subject Matter Disclosed In the Swartz et al. Patent

The Swartz *et al.* patent discloses a scanner 164 having a mirror 150 mounted along one edge in cantilever fashion. Rather than the mirror 150 pivoting to scan a light beam, the mirror 150 bends downwardly as shown in Figure 11 A to scan a light beam. According to the Office Action, "[i]t would have been obvious to a person of ordinary skill in the art... to utilize the deformable mirror 150 taught by Swartz et al. for the mirror disclosed in the scanner of McClelland because this would improve miniaturized, increased flexibility barcodes scanner, while fabricating mirror simpler and low cost (column one, lines 39-46 of Swartz *et al.*"

C. Claim 27 Would Not Have Been Obvious Over The McClelland et al. Patent In View Of The Swartz et al. Patent

i) The Teaching Of The McClelland *et al.* Patent Cannot Be Combined With The Teachings Of The Swartz *et al.* Patent

The teachings of the McClelland et al. patent cannot be combined with the teachings of the Swartz et al. patent for two reasons. First, there is no suggestion in either of these references of combining their respective teachings. Second, it does not seem to be physically possible to combine the respective structures disclosed in these references.

The Office Action correctly recognizes that the prior art references must teach the desirability of combining their respective teachings. However, the Office Action relies for this requirement on the fact that the structure resulting from combining the teachings, *i.e.*, applicants' claimed structure, would have the desirous properties of "improve miniaturization, increased flexibility barcode scanner, while fabricating mirror simpler at low cost" as discussed on, lines 39-46 of the Swartz *et al.* patent. The reliance on this teaching is misplaced for two reasons. First, the fact that the claimed invention has desirable properties that can be achieved by

purportedly combining the teachings of cited references would allow references to be combined any time a claimed invention had desirable properties. The references could be combined regardless of whether any of the cited references themselves suggested combining their teachings. Second, a teaching in a prior art patent that the structure disclosed therein has desirable properties is not, in and of itself, a teaching that the prior art patent should be combined with the teachings of another prior art patent. Otherwise, a patent ascribing a desirable property to the disclosed structure could be combined with any other patent on that basis alone. Instead, one of the prior art references itself must suggest the desirability of combining the teaching of the prior art references. In this case, the Examiner has not cited any portion of either the McClelland *et al.* or the Swartz *et al.* patent that provides any motivation or suggestion to combine their respective teachings.

Not only do the McClelland *et al.* and Swartz *et al.* patents fail to suggest combining their respective teachings, but it does not seem physically possible to combine the structures disclosed in those patents. The McClelland *et al.* patent teaches a scanner having a mirror that is supported by a pair of aligned torsion bars. The Swartz *et al.* patent teaches a mirror that is mounted in cantilever fashion. It is not all apparent how a cantilever supported mirror could be combined with a mirror supported by a pair of torsion bars, nor does the Office Action provide any such explanation. If a bending force was applied to the mirror disclosed in the McClelland *et al.* patent, there is no reason to believe the mirror would deform since the torsion bars are disclosed as being relatively thin and compliant. Therefore, the only deformation would in the torsion bars. Moreover, these is no apparent reason why one would be motivated to apply a deforming force to a mirror as taught by Swartz *et al.* if the mirror was supported by torsion bars since McClelland *et al.* teach that such mirror is scanned by rotating the mirror about an axis defined by the torsion bars.

ii) The Combined Teaching Of The McClelland *et al.* Patent And The Swartz *et al.* Patent Would Not Suggest The Claimed Invention

Even if the teachings of the references could someone be combined to suggest a bendable mirror supported between a pair of torsion bars, the references could still not be considered to suggest the subject matter of claim 27. Claim 27 specifies a "primary mirror" that scans at a scanning frequency as well as a resonant reflector that scans at a resonant frequency.

Claim 27 further specifies that the "scanning frequency is an integral multiple of the resonant frequency." Yet there is not disclosure in the cited references, taken either alone or in combination, of two mirrors or reflectors, one of which has a scanning frequency that is the multiple of the scanning frequency of the other. The only attempt to address this deficiency is in the "Response to Arguments" section of the Office Action which states that:

> McClelland et al reviews the micro scanner mirror is a microelectromechanical (MEMs) membrane (see col. 1, lines 20-2). Swartz et al teaches a scanner which includes deformable mirror 150 (Figure 11 A., col. 7, line 9). These arguments are not persuasive because the combination teaching of McClelland and Swartz will perform the scanning frequency is an integral multiple of the horizontal scanning frequency."

However, even if the prior art did disclose that applicants' mirror is a MEMS membrane that can be deformed, that teaching would not provide a teaching that they primary mirror is scanned at a scanning frequency that is an integral multiple of the resonant frequency of the resonant reflector. At best, the combined teachings of McClelland et al. and Swartz et al. would result in the teaching of a single deformable mirror; they would not result in the teachings of a second mirror, i.e. the primary mirror, scanning at a frequency that is an integral multiple of the resonant frequency of the single deformable mirror.

In summary, the teachings of the McClelland *et al.* patent in the Swartz *et al.* patent cannot be combined because there is no suggestion to do so and because the structures are physically incompatible. Further, even if their teachings could be combined, the combined teaching which still not suggest the subject matter of claim 27. Claim 27 would therefore not have been obvious over the teachings of the McClelland *et al.* patent in view of the teachings of the Swartz *et al.* patent.

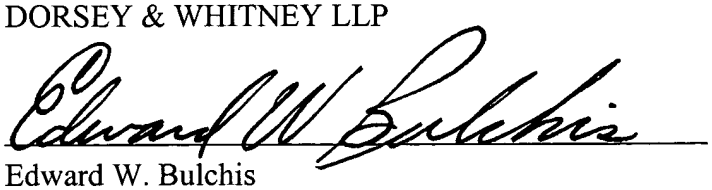
IX. APPENDIX

Attached hereto is a copy of pending claim 27, which is the subject matter of this appeal.

Respectfully submitted,

Clarence T. Tegreene and David L. Dickensheets

DORSEY & WHITNEY LLP



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APPENDIX

27. A scanning apparatus, comprising:

a primary mirror that moves through a predetermined scan path at a selected scan rate having a scanning period that defines a scanning frequency; and

a resonant reflector aligned to the scanning mirror and being of the type that moves resonantly through a movement path and a resonant frequency, wherein the scanning frequency is an integral multiple of the resonant frequency wherein the resonant reflector is a microelectromechanical (MEMS) membrane in wherein the movement path includes deformation of the membrane.